7-point Subjective Global Assessment is more time sensitive than conventional Subjective Global Assessment in detecting nutrition changes

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ABSTRACT

Background: It is important for nutrition intervention in malnourished patients to be guided by accurate evaluation and detection of small changes in the patient's nutrition status over time. However, the current Subjective Global Assessment (SGA) is not able to detect changes in a short period of time. The aim of the study was to determine whether 7-point SGA is more time sensitive to nutrition changes than the conventional SGA.

Methods: In this prospective study, 67 adult inpatients assessed as malnourished using both the 7-point SGA and conventional SGA were recruited. Each patient received nutrition intervention and was followed up post-discharge. Patients were reassessed using both tools at 1, 3 and 5 months from baseline assessment.

Results: It took significantly shorter time to see a one-point change using 7-point SGA compared to conventional SGA (median: 1 month vs. 3 months, $p = 0.002$). The likelihood of at least a one-point change is 6.74 times greater in 7-point SGA compared to conventional SGA after controlling for age, gender and medical specialties (odds ratio = 6.74, 95% CI 2.88-15.80, $p<0.001$). Fifty-six percent of patients who had no change in SGA score had changes detected using 7-point SGA. The level of agreement was 100% ($k = 1$, $p < 0.001$) between 7-point SGA and 3-point SGA and 83% ($k=0.726$, $p<0.001$) between two blinded assessors for 7-point SGA.

Conclusion: The 7-point SGA is more time sensitive in its response to nutrition changes than conventional SGA. It can be used to guide nutrition intervention for patients.

Keywords

7-point Subjective Global Assessment; Nutrition status; Malnutrition; Nutrition changes; Intervention

Clinical Relevancy Statement

It is important for nutrition intervention in malnourished patients to be guided by accurate evaluation and detection of small changes in the patient's nutrition status over time. This study shows that the 7-point SGA is more time sensitive in its response to nutrition changes than conventional SGA. These findings are clinically relevant to guide dietitians and clinicians in monitoring the effectiveness of nutrition intervention and in making timely changes to improve the outcomes of patients.

Introduction

Malnutrition is prevalent in hospitals and leads to adverse outcomes.[1-3] Studies have shown that patient outcomes can be improved with nutrition support.[4,5] Nutrition intervention must be guided by accurate evaluation and detection of small changes in the patient's nutrition status over time. Subjective Global Assessment (SGA) is a well validated tool widely used to assess nutrition status of patients.[6-8] It involves assessing five components of medical history (weight and dietary intake changes, gastrointestinal symptoms, functional capacity, metabolic stress from disease) and three components of physical examination (muscle wasting, fat depletion, nutrition-related edema).[6] The final rating of SGA is a subjective summation of the eight components to classify patients into three categories; A: well nourished, B: moderately malnourished and C: severely malnourished.[6] Despite widespread use of SGA for initial nutrition assessment, very few studies have used this tool to assess changes in nutrition status over time.[9] In a review paper by Weekes et al (2009) which looked at the impact of nutrition intervention on outcomes, none of the studies cited used SGA as outcome measures.[10] Interventional studies using SGA usually showed no significant change between the pre and post results or did not report outcomes using this tool.[5,11,12] This lack of change may be related to the limited information on the repeatability of SGA, it is unknown over what time frame SGA should be repeated to assesses changes in nutrition status. Given the well-established association between malnutrition and increased risk of morbidity and mortality,[1-3] monitoring changes in nutrition status is vital, especially in patients who have already been assessed as malnourished or those at risk of further nutrition deterioration.

One of the disadvantages of the conventional SGA is that small differences in nutrition status during follow-up cannot be detected.[13,14] To overcome this problem, Churchill et al

expanded the traditional SGA tool to a 7-point scale to assess change in nutrition status among 680 patients starting peritoneal dialysis (CANUSA study).[15] The ratings for nutrition status were expanded to range from 1 to 7, in which ratings of 1-2 signify severely malnourished, 3-5 signify moderately malnourished and 6-7 signify well nourished.[15] Therefore, the results of nutrition status as assessed by the 7-point scale will always be aligned with the conventional SGA, i.e. well nourished, moderately malnourished or severely malnourished. The CANUSA study showed that a one unit lower in the 7-point SGA score was prospectively associated with a 25% increase in the relative risk of death.[15]

Since the CANUSA Study, there has been increased use of 7-point SGA, however this has been limited to renal patients.[13,16,17] No studies have reported on the use of 7-point SGA in other patient groups. Some authors have speculated that 7-point SGA may be more sensitive than the conventional SGA in identifying small changes in nutrition status.[17,18] Given the broad nature of a 3-point rating in the conventional SGA, a substantial improvement in nutrition status may be required before patient transitions from a 'B' (moderately malnourished) to an 'A' (well nourished) rating. In contrast, when using 7-point SGA a moderately malnourished patient may improve from a rating of 3 to 4. In this instance, the patient is still classified as moderately malnourished, but smaller changes in nutrition status are detected. Valid improvements in score within a broad category would suggest improved nutrition status, and conversely any deterioration in status can be detected and addressed quickly. To date, no studies have been published to support this opinion.

The aim of the study was to determine if 7-point SGA is more time sensitive in its response to nutrition changes than conventional SGA across different patient diagnostic groups.

Methods

Screening and Study Participants

All patients were screened for risk of malnutrition on admission using 3-Minute Nutrition Screening[19,20] by the ward nurses as per hospital protocol. Any patient identified as at risk of malnutrition was referred to the hospital dietitian, who confirmed the diagnosis of malnutrition using SGA[6] and provided individualized nutrition intervention and counseling on the ward. Consecutive malnourished adult patients aged ≥ 21 years of age were recruited for the study. Psychiatry patients, maternity patients, patients on palliative care and patients discharged to a nursing home or community hospital were excluded from the study. The National Healthcare Group Domain Specific Review Board approved the study protocol. Informed written consent was obtained from each participant.

Baseline assessments

For the purpose of this study, nutrition status was re-assessed using conventional SGA and 7-point SGA by a study dietitian no more than four days before the patient was discharged from hospital, and this was considered as baseline for tracking the nutrition status of patients post-discharge. For better standardization among assessors, 7-point SGA (Figure 1) was modified from the one used in the CANUSA Study[15] to include a selection of ratings within each component. We tested the validity of this modified 7-point SGA against baseline Body Mass Index (BMI) and mid arm circumference (MAC) which were measured at the same sitting. A calibrated digital Seca weighing and height machine (Seca, Seca Deutschland, Germany) was used to measure body weight to the nearest 0.1 kilogram and height to the nearest 0.01 meter.

Body mass index was calculated by dividing body weight in kilograms with height in meters squared. Mid arm circumference was measured on the non-dominant arm using a measuring tape with the arm hanging relaxed. Measurements were taken midway between the point of the acromion and olecranon process three times, and the average was calculated. Jamar dynamometer (Jamar, Sammons Preston Royland, USA) was used to measure handgrip strength on the dominant hand according to the procedure recommended by the American Society of Hand Therapists.[21] The elbow of the dominant arm was flexed in 90° position with the shoulder and wrist in neutral positions. The handle of the dynamometer was set at the second position. It was then placed in the patient's hand and the dietitian would encourage the patient to squeeze as hard as possible. The measurements were taken three times with a two minute rest in between trials and the average of the three measures was used. Assessment of quality of life was carried out using the European Quality of Life - Visual Analogue Scale (EQ-VAS).[22] In the EQ-VAS, participants recorded their current health status on a vertical, visual analogue scale where the endpoints are labelled 'best imaginable health state' and 'worst imaginable health state'.To assess the reliability of 7-point SGA, inter-rater agreement between the two study dietitians was conducted on 37 patients before the commencement of the study. The first dietitian assessed each patient using 7-point SGA, followed by the second dietitian who repeated the 7-point SGA assessment and was blinded to the results of the first dietitian.

Follow-up assessments

Each patient was provided with follow-up appointments at an outpatient clinic 1 month, 3 months and 5 months post discharge from hospital. During these follow-up visits, patients were reassessed using 7-point SGA and conventional SGA. All patients were given individualized

nutrition intervention and counseling as appropriate by the study dietitian. Patients who failed to turn up for scheduled outpatient appointments were home-visited by the study dietitian within one week of the missed appointments. At the fifth month follow-up, assessment using 7-point SGA and conventional SGA was carried out by a second dietitian who was blinded to the results of the previous ratings. Patient's body weight, handgrip strength and assessment of quality of life using the EQ-VAS were also measured.

Statistical analyses

All statistical analyses were performed using the Statistical Package for the Social Sciences for Windows (version 21.0, SPSS Inc., Chicago, IL, USA) with statistical significance set at $p < 0.05$. The Kappa Measure of Agreement test was used to assess if there was any variability between the 7-point SGA and the conventional SGA as well as the inter-rater agreement in the measurement of 7-point SGA between the two assessors. Logistic regression was used to compare the likelihood of detecting a change between 7-point SGA and conventional SGA, controlling for confounding factors such as age, gender and medical specialties and presenting the results as odds ratio at 95% confidence intervals (CI). The dependent variable in this model was whether there was a change in SGA score; the reference category being either the 7-point SGA or the conventional model. Wilcoxon Signed Ranks test was performed to determine the time to see a minimum one-point change in both 7-point SGA and conventional SGA and this was reported as median value. Time was categorized as a 1 month, 3 months or 5 months to see a change in SGA score for both 7-point SGA and conventional 3-point SGA. This was because patients were followed up at these intervals after baseline SGA was measured. Spearman's rho was used to determine the correlation between changes in both SGAs and

changes in body weight, handgrip strength, EQ-VAS and upper-arm anthropometries. The level of agreement between 7-point SGA and 3-point SGA and the inter-rater agreement between the two assessors using 7-point SGA was reported as % agreement and Kappa statistics.

Results

Participants' Demographics

A total of 105 patients assessed as malnourished were approached to participate in this study. Twelve patients were not keen to participate in the study citing busyness and not wanting the extra hassle. During the five months study, a total of 26 patients dropped out - ten patients were discharged to step-down care such as community hospital and/or nursing home, four patients returned to their home country, four patients had caregivers who were not keen to continue, five patients were discharged to palliative care and three patients were uncontactable. A total of 67 patients completed the study. The average length of stay for the study patients was 9.4 days. The demographic profiles of the study subjects and the spread of medical specialties are described in Table 1.

Validity and Reliability

The 7-point SGA scale was positively correlated with BMI (rho = 0.77, $p < 0.001$) and MAC (rho = 0.84, $p < 0.001$), patients who had higher SGA score were more likely to have a higher BMI and MAC. The level of agreement between 7-point SGA and 3-point SGA was 100% ($k = 1$, $p < 0.001$). The inter-rater agreement between two assessors for 7-point SGA was good, at a rate of 83% ($k = 0.726$, $p < 0.001$).

Time Sensitivity

Table 2 shows the frequency of the overall change in SGA score using 7-point SGA and conventional SGA. Of the 39 patients that had no change in their score using conventional SGA,

22 patients (56%) had a change in their score within the same nutrition status category using 7-point SGA.

It took significantly shorter time to see a one-point change using 7-point SGA compared to conventional SGA (median: 1 month vs. 3 months, p = 0.002). The likelihood of at least a one point change over a five month period is 6.74 times greater using 7-point SGA compared to conventional SGA after controlling the results for age, gender and medical specialties (Adjusted Odds Ratio: 6.74, 95% CI: 2.88-15.80, p <0.001). nutrition

Correlations

Table 3 compares the correlation between changes in both the 7-point and conventional SGA and changes in body weight, handgrip strength, EQ-VAS and upper-arm anthropometries. There is moderate positive linear correlation between changes in 7-point SGA and weight gain (rho = 0.681, p <0.001) and mild positive linear correlation between changes in 7-point SGA and increased in handgrip strength (rho = 0.346, p = 0.007) and improvement in quality of life scale using EQ-VAS (rho = 0.369, p = 0.006). The correlation between changes in conventional SGA and weight change is mild (rho = 0.589, p<0.001) and only weak correlation were found between changes in conventional SGA and handgrip strength (rho = 0.210, p = 0.111) and EQ-VAS (rho = 0.124, p = 0.366).

Discussion

The current study has shown for the first time that 7-point SGA is able to detect response to nutrition intervention faster than conventional SGA in adult malnourished patients. It took significantly shorter time to see a one-point change using 7-point SGA in comparison to conventional SGA. Our study shows that even though there appears to be no change in classification using conventional SGA, changes in score within the traditional categories using 7-point SGA were observed in 56% of these patients. This is important as repeated measures of nutrition assessment over time yields valuable information that might help guide the nature of the nutrition advice or intervention given. From this current study, we are able to show that 7-point SGA is a useful nutrition assessment tool in detecting nutrition changes over relatively shorter periods of time when compared to conventional SGA. Consequently, nutrition intervention can be adjusted or fine-tuned earlier if patient does not respond to the nutrition treatment.

Up till today, no study has provided evidence-base for the time sensitivity of 7-point SGA and many dietitians and clinicians especially outside of renal specialty are not aware of the usefulness of 7-point SGA due to lack of published evidence. Although SGA has been a widely validated and well accepted tool to determine the nutrition status of patients,[7,8] it has not been used in many studies to report changes in nutrition outcomes.[10] Even studies that use SGA initially, do not report outcomes using this tool.[5,12] Instead, changes in body weight are most commonly cited in studies that span over three months to determine changes in nutrition status of patients.[4,23,24] This is probably due to the limitation of conventional SGA, where it is often not able to detect change in nutrition status in a shorter period of time even when weight change is present. However, there are limitations to using weight change to monitor nutrition status, as

changes in body weight may be confounded by alterations in body composition and fluid retention commonly associated with illness.[25,26] In addition, weight measurements pose challenges in patients who are bed bound or old and frail. In an audit of 526 hospital admissions, only 67% of the population had information on weight.[27] Even in the clinical research context, there are difficulties in obtaining complete weight and height data.[28,29] In clinical practice, unavailable weight records can be as high as 74-85%.[28-30]

Malnutrition has been shown to have numerous detrimental effects on health and quality of life.[1-3] To ensure appropriate nutrition care is provided, an in-depth assessment of a patient's nutrition status is needed, and SGA has been developed for this purpose.[6] However, once nutrition intervention is implemented, tracking changes in nutrition status is required to evaluate the effectiveness of the chosen intervention, and to prompt changes in the treatment plan as required. The benefit of 7-point SGA is that it can potentially detect comparatively small changes within the broader categories of nutrition status. A study by Campbell et al. (2007) on patients with chronic kidney disease showed a difference in body composition between the rating points of 7-point SGA (3, 4 and 5) within the same category of nutrition status (SGA B).[17] Using total body potassium, a gold-standard measure for body cell mass, a linear increase in mean body cell mass from ratings 3 to 5 in 7-point SGA was detected. This suggests that nutrition change took place even though patients would still have been considered moderately malnourished (rating 'B') within the broad categories of conventional SGA.[17]

The subjectivity of the conventional SGA tool has been raised in many studies and is one of the major limitations of this tool.[14,31] The expanded scale and detailed response options in the 7-point SGA have their advantages in overcoming this limitation. They enable standardized scoring and objectivity of the assessors within each item in the 7-point SGA. This may partly

explain the good inter-rater reliability of 7-point SGA between dietitians, despite the tool having seven ratings of nutrition status. Previous studies on SGA have shown inter-rater reliability of 79% and 81%.[7,8] The ambiguity in the conventional SGA is addressed in 7-point SGA, whereby the expanded items in each component are specified clearly (Figure 1), thus facilitating greater standardization between assessors. The clarity of 7-point SGA is enhanced by clear instruction that functional status should be nutrition related and not the consequence of a debilitating medical condition such as stroke, and that at least 3 muscle areas need to be examined.

Similar to conventional SGA, the final rating in 7-point SGA is based on the subjective weighting of the components to classify patients into 3 categories: well nourished, moderately malnourished and severely malnourished. Hence, 7-point SGA can always be converted to conventional SGA rating (but not vice-versa). This was clearly demonstrated by the excellent level of agreement between 7-point SGA and 3-point SGA in this study. With this, the prognostic validity of 7-point SGA remains the same as conventional SGA, which has been shown to have good prognostic value for a range of clinical outcomes such as mortality, length of hospital stay and readmission.[1,3] Previous studies have found the 7-point SGA to be a valid and reliable tool to assess patient's nutrition status. However these studies were conducted on renal patients.[13,16] This current study conducted on multidisciplinary medical specialties shows that 7-point SGA is highly correlated with other nutrition parameters (BMI and MAC), and therefore provides evidence-based on its validity and use in specialties besides renal patients.

The study also shows that changes in 7-point SGA correlate better with changes in body weight, handgrip strength, mid arm muscle circumference and quality of life (QoL) measures than conventional SGA. Body weight, handgrip strength, mid arm anthropometries and QoL are commonly used as outcome measures for nutrition intervention in malnourished patients.[4,5]

However, as each of these parameters on its own cannot be used as a sole indicator of malnutrition, the ability of 7-point SGA to diagnose malnutrition as well as to monitor the nutrition progress of patients is notable.

There are several strengths in this study. This is the first study to show that 7-point SGA can be used to detect nutrition changes faster than conventional SGA. This facilitates earlier evaluation of the impact of any nutrition intervention, and provides critical guidance to the healthcare professional in making decisions regarding medical nutrition therapy. Another strength of this study is the use of a blinded assessor method to test the inter-rater reliability of 7-point SGA.

In addition, this study was carried out across a range of medical conditions. In contrast, 7-point scale SGA introduced in the CANUSA study[15] has only been studied in renal patients.[13,16,17] The inclusion of a range of medical conditions is advantageous as patients usually present with multiple comorbidities. Furthermore, it is not practical to switch from one tool to another for different medical conditions. The aim is to minimize confusion among staff, standardize practice and conserve resources in training staff when they transfer from one ward to another. Nutrition

This study was conducted on a small sample size, with the majority being Asians which limits the generalizability of the findings. In addition, using BMI and MAC may not be accurate surrogates for body composition. Future studies on non-Asians and validating the 7-point SGA with more accurate surrogates for body composition such as dual energy X-ray absorptiometry (DEXA) would greatly extend the applicability of this tool. As the same dietitian assessed 7-point SGA during the baseline measurement and at 1 month and 3 months post discharge,

observer bias is a limitation of this study. To overcome this limitation, the fifth month assessment was carried out by a second dietitian blinded to the previous ratings in the sequential measures of 7-point SGA. Another limitation of our study is that confounders such as age may have influenced the assessment of nutrition status using either tool. However, this has been minimized as the trained study dietitians undergo yearly competency assessments on the use of 7-point SGA and conventional SGA. The severely malnourished group was under-represented in this study. This could be because a number of severely malnourished patients were on palliative care which fell under the exclusion criteria of this study.

This study confirms that the 7-point SGA detects changes in malnutrition earlier than the conventional SGA. However, nutrition changes earlier than one month were not tested. If it is able to detect changes over a seven or fourteen-day period, it might then be useful as a tool for serial measures during a patient's hospital stay, in which inflammatory responses challenge body energy and protein reserves. This study showed that it took a significantly shorter time to see a one-point change using 7-point SGA (1 month) compared to conventional SGA (3 months). It would be useful to know the minimum amount of time over which the 7-point method can detect change. If this method can be validated over a series of shorter time intervals between patient visits, it may provide invaluable information to track the effectiveness of nutrition interventions to make timely changes in improving the clinical outcomes of patients. Future studies to assess the ability of the method to detect important clinical outcomes such as mortality and readmission rates with each point change in the scoring is also warranted.

Conclusions

The 7-point SGA is more time sensitive in its response to nutrition changes than conventional SGA. It can be used in a range of medical conditions and adult age groups to assess and monitor the progress of nutrition status in patients. More importantly, it can be used to guide nutrition intervention for patients.

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Table and Figure Legends

Legends for Table 1:

Table 1. Demographics of the study subjects at baseline (n= 67)

n= number; SD = standard deviation

[a]Severity of malnutrition as defined by 7-point Subjective Global Assessment

Legends for Table 2:

Table 2. Change in overall nutrition assessment rating between baseline and the fifth month using 7-point SGA and conventional SGA (n=67)

SGA = Subjective Global Assessment

NA = Not applicable

Legends for Table 3:

Table 3. Correlation between changes in 7-point SGA and conventional SGA and changes in body weight, handgrip strength, quality of life and upper-arm anthropometries in 5 months

SGA = Subjective Global Assessment

EQ-VAS = Euro-Quality of Life - Visual Analogue Scale

[a]Moderate correlation, [b]Mild correlation, [c]Weak correlation

[§] Missing data due to refusal or inability of patients to be measured.

Legends for Figure 1:

Figure 1. 7-point Subjective Global Assessment (7-point SGA)

Table 1

Demographics of the study subjects at baseline (n= 67)

Characteristics	**n (%)**	**Mean ± SD [Range]**
Age (years)		63.9±14.5 [(27-87]
Gender		
Male	30 (45)	
Female	37 (55)	
Ethnicity		
Chinese	52 (78)	
Malay	8 (12)	
Indian	4 (6)	
Others	3 (4)	
Baseline Nutrition Status[a]		
Moderately malnourished:Severely malnourished	62:5 (93:7)	
SGA rating 5	23 (34)	
SGA rating 4	24 (36)	
SGA rating 3	15 (22)	
SGA rating 2	5 (8)	
SGA rating 1	0 (0)	
Specialty		
General Surgery	19 (28)	
General Medicine	15 (22)	
Cardiology	10 (15)	
Respiratory	5 (7)	
Gastroenterology	4 (6)	
Oncology	4 (6)	
Endocrinology	3 (5)	
Geriatrics	3 (5)	
Orthopedic	2 (3)	
Nephrology	2 (3)	

n= number; SD = standard deviation

[a]Severity of malnutrition as defined by 7-point Subjective Global Assessment

Table 2

Change in overall nutrition assessment rating between baseline and the fifth month using 7-point SGA and conventional SGA (n=67)

Change in ratings between baseline and 5th month	**7-point SGA**	**Conventional SGA**
	n (%)	n (%)
0-point [no change]	17 (25)	39 (58)
1-point	30 (45)	28 (42)
2-point	15 (22)	0 (0)
3-point	5 (8)	NA
Total patients with a change in score	50 (75)	28 (42)

SGA = Subjective Global Assessment

NA = Not applicable

Table 3

Correlation between changes in 7-point SGA and conventional SGA and changes in body weight, handgrip strength, quality of life and upper-arm anthropometries in 5 months

Changes observed between baseline and 5th month	**n**	**Changes 7-point SGA**		**Changes in conventional SGA**	
		Correlation (rho)	p value	Correlation (rho)	p value
Weight change	67	0.681[a]	<0.001	0.589[b]	0.001
Changes in handgrip strength	59[§]	0.346[b]	0.007	0.210[c]	0.111
Changes in quality of life (EQ-VAS)	55[§]	0.369[b]	0.006	0.124[c]	0.366
Changes in mid arm circumference	63[§]	0.473[b]	<0.001	0.475[b]	<0.001
Changes in triceps skinfold thickness	63[§]	0.395[b]	<0.001	0.483[b]	<0.001
Changes in mid arm muscle circumference	63[§]	0.415[b]	<0.001	0.364[b]	0.003

SGA = Subjective Global Assessment

EQ-VAS = Euro-Quality of Life - Visual Analogue Scale

[a]Moderate correlation, [b]Mild correlation, [c]Weak correlation

[§] Missing data due to refusal or inability of patients to be measured.

Figure 1: 7-point Subjective Global Assessment (7-point SGA)

	RATINGS (circle one rating for each category)		
Weight loss ____ kg in the past 6 months If ↑ weight trend, add 1 point, if ↓ weight trend within 1 month, minus 1 point	7 6	5 4 3	2 1
Dietary Intake (past 2 weeks) 7) Good (Full share of usual meal) 6) Good (> ¾ - <1 share of usual meal) 5) Borderline (½ – ¾ share of usual meal) but increasing 4) Borderline (½ – ¾ share of usual meal), no change or decreasing 3) Poor (< ½ share of usual meal) but increasing 2) Poor (< ½ share of usual meal) no change or decreasing 1) Starvation (<¼ of usual meal)	7 6	5 4 3	2 1
Gastrointestinal symptoms (that persisted for > 2 weeks) Nausea: _____ Vomiting: _____ Diarrhea: _____ 7) No symptom 6) Very few intermittent symptoms (1x per day) 5) Some symptoms (2-3x per day) - improving 4) Some symptoms (2-3x per day) – no change 3) Some symptoms (2-3x per day) – getting worse 1-2) Some or all symptoms (> 3x per day)	7 6	5 4 3	2 1
Functional status (nutrition related) 6-7) Full functional capacity 3-5) Mild to moderate loss of stamina 1-2) Severe loss of functional ability (bedridden)	7 6	5 4 3	2 1
Disease state affecting nutrition requirements 6-7) No increase in metabolic demand (no or low stress) 3-5) Mild to moderate increase in metabolic demand (moderate stress) 1-2) Drastic increase in metabolic demand (high stress)	7 6	5 4 3	2 1
Muscle wastage: (at least 3 areas) 6-7) No depletion in all areas 3-5) Mild to moderate depletion 1-2) Severe depletion	7 6	5 4 3	2 1
Fat stores 6-7) No depletion in all areas 3-5) Mild to moderate depletion 1-2) Severe depletion	7 6	5 4 3	2 1
Edema: (nutrition related) 6-7) No edema 3-5) Mild to moderate edema 1-2) Severe edema	7 6	5 4 3	2 1

Ratings	Weight loss
7	0%
6	<3%
5	3-<5%
4	5-<7%
3	7-<10%
2	10-<15%
1	≥15%

Nutrition Status: Well Nourished / Mildly to Moderately Malnourished / Severely Malnourished

Overall SGA Rating: 7 6 5 4 3 2 1

(circle one)